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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/784,095	02/16/2001	Garrett R. Vargas	03797.00044	3218

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EXAMINER

BANANKHAH, MAJID A

ART UNIT

PAPER NUMBER

2127

DATE MAILED: 04/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/784,095

Applicant(s)

VARGAS ET AL.

Examiner

Majid A Banankhah

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 16 February 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>4</u> . | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

1. This office action is in response to application filed on April 25, 2000. Claims 1-23 are considered for examination.

#### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-7, and 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Binns et al. (U. S. Pat. No. 6,189,022, hereinafter Binns).

As to claim 1, and 15, the reference of Binns teaches of:

a method for scheduling periodic events in a computing system, comprising the steps of storing a schedule list of time entries for a plurality of periodic events (col. 1, lines 66-68, continued on col. 2, lines 1-6, *all periodic tasks are assumed to be scheduled using Rate Monotonic scheduling (RMS) where incremental and design-to-time processes have as their statically specified worst case compute time, the minimum amount of time to produce an acceptable but suboptimal result. The algorithms used to answer the question "how much time is available?" are based on a slack stealer with practical extensions for real world implementations*), wherein one or more of said periodic events is to occur at one or more times represented by said list of time entries (col. 4, see Table A);

comparing said period time data with said schedule list to determine whether said a periodic event can occur at one or more of said times represented by said schedule list of time entries; and

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modifying said schedule list of time entries responsive to said step of comparing (col. 4, lines 41-65, slack time adjustment for the runtime calculations).

While the reference of Binns teaches of modifying the schedule list for the existing processes he fails to explicitly teach of “receiving a registration request for a new periodic event from a process, wherein said registration request includes period time data for said new periodic event”.

However, it is well known in the art at the time the invention was made to schedule a new processes and register the information regarding the new process at times when a new process is added to the list of periodic processes for the reason that new processes be scheduled when they arrive and be given a chance to be scheduled. It is also well known in the art that time data be included in the request when a request for a scheduling process is submitted, for the reason that any Therefore, it would have been obvious for one ordinary skill in the art at the time the invention was made to modify the invention of Binns to incorporate the addition of new process scheduling routine for the reason to be able to schedule the periodic processes when a new process is added to the pool of processes. The modification would have been obvious because, whenever a new process is added, the whole scheduling process does not have to be restarted. Per claim 2, the limitation of “period time data includes a plurality of time values” is taught by Binns in col. 2, lines 38-47 (deadline and start time).

Per claim 3, “one of said plurality of time values in said period time data indicates an open end of a time range”, is taught by Binns in col. 2, lines 37-47 (preperiod deadline is supported).

Per claim 4, “wherein said step of modifying, includes the step of storing an indication that said new periodic event is to occur at one or more of said one or more times represented by said

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schedule list of time entries” is taught by Binns in col. 2, lines 58-68 (optional component and increments and worst case execution time).

Per claim 5, “said step of modifying includes the step of adding one or more new time entries to said schedule list of time entries”, is taught by Binns in col. 4, lines 49-68, continued on col. 5, lines slack value, increments, minimum if slack value and deadline).

Per claim 6, “said step of modifying further includes the step of extending said schedule list of time entries such that a last entry in said schedule list is a common multiple of a plurality of periods of said plurality of periodic events” is taught by Binns in Fig. 3 (See transformed with slack stealing between 9-10, 10-11, and 11-12).

Per claim 7, for the rejection of “computer-readable medium having computer-executable instructions for performing the steps recited in claim 1”, please see the rejection of claim 1 above.

Per claim 16, the limitation of “adding a new entry to said schedule list if said minimum time parameter is a wildcard value and said maximum time parameter is less than a time value of said first entry in said schedule list; and extending said schedule list until a last entry in said list is a common multiple of a plurality of periods for said plurality of periodic events” is taught by Binns in Fig. 3 (See transformed with slack stealing between 9-10, 10-11, and 11-12).

Per claim 17, if the maximum time value is worse case time slice execution time and the time values in Fig. 3 are integer multiple of last entry (See, the chart in Fig. 3 [tau]).

Per claim 18, see the rejection of claim 15.

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4. Claims 8-14, and 19-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Binns et al. (U. S. Pat. No. 6,189,022, hereinafter Binns) as applied to claims 1-7, and further in view of Imanishi et al (U. S. Pat. No. 6,243,735 hereinafter Imanishi).

Per claim 8, the modified reference of Binns fails to explicitly teach of "processes are to be checked to determine whether said critical processes remain active, wherein said time entries in said schedule list are synchronized; using said schedule list to periodically verify that said critical processes remain active; and taking corrective action when one of said critical processes no longer remains active". However, Imanishi teaches of a scheduling system with a task management information system in which a state information is provided for each task or process that verifies the state of the process and execution state of the task, for the reason to be able to verify the state of the process at any time in order to be able to do the slack stealing and adjustment of Binns' system (See, Imanishi, col. 1, lines 62-68, continued on col. 2, lines 1-25). A person ordinary skill in the art would be motivated because without a verification system of the state of the process at any time, it would be impossible to perform dynamic adjustment and be able to schedule the entry of the new periodic events and do the synchronization [switching between ready to active and active to sleep] and scheduling functions (See, Imanishi, col. 2, lines 22-25, and 26-35). Therefore, it would have been obvious for a person ordinary skill in the art at the time the invention was made to modify the periodic event scheduling system of Binns with state information verification of Imanishi in order to do the scheduling modification and adjustment to the schedule and take corrective action in response.

Regarding the minimum time parameter and maximum time parameter and wild card value the limitation is taught by Binns in col. 1, lines 66-68, continued on col. 3, lines 1-28, and col. 4,

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lines 49-68, continued on 1-4, and col. 6, lines 59-68 (minimum amount of time to produce an acceptable suboptimal result, maximum execution time, and slack value).

Per claim 9, the limitation of “wherein said computer-readable instructions for performing said step, of using said schedule list are for further performing, the steps of sending a first signal to a first critical process at a first time in said schedule list; waiting for a second time in said schedule list, wherein said second time corresponds to said first critical process; at said second time, determining whether a response to said first signal was received from said first critical process; resending said first signal to said first critical process if said response was received; and taking corrective action if said response was not received from said first critical process: is taught by Imanishi in col. 2, lines 58-68, continued on col. 3, lines 1-10, and col. 4, lines 39-68, continued on col. 5, lines 1-21 (activation signal, state information representing state of the execution of the process signal, and termination signal in response to the state information execution signal).

Per claim 10, wherein said computer-readable instructions for performing said step of taking corrective action are for further performing the step of restarting said first critical process is taught by Imanishi in col. 5, lines 65-68, continued on col. 6, lines 1-5 (the state of SLEEP is changed to READY if the execution of a core allocated to that task is terminated).

Per claim 11, the limitation of “wherein said schedule list further comprises information identifying one or more of said plurality of critical processes” is taught by Binns in Fig. 3.

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Per claim 12, the limitation of “a last time entry in said schedule list includes a time value that is a common multiple of a plurality of periods associated with said plurality of critical processes” is taught by Binns in Fig. 3 (See transformed with slack stealing between 9-10, 10-11, and 11-12).

Per claims 13-14, the limitation of “said computer-readable medium is enclosed within a portable computing device” and “said portable computing device is a cellular telephone or a pager” is obvious for the reason that any portable computing device with a microprocessor such as a laptop or notepad or cellular phone can perform the steps of the steps of the method.

Per claim 19, see the rejection of claim 1. Regarding one of a process monitoring the one or more of a plurality of processes, the process of Imanishi is monitoring the status information of the other processes.

Per claim 20, the limitation of “event identification information identifies a plurality of periodic events, and said schedule list includes an entry having time information that is a common multiple of time periods for each of said plurality of periodic events” is taught by Imanishi regarding the identifying the periodic event, See, Imanishi in col. 2, lines 58-68, continued on col. 3, lines 1-10, and col. 4, lines 39-68, continued on col. 5, lines 1-21 (activation signal, state information representing state of the execution of the process signal, and termination signal in response to the state information execution signal), and regarding the common multiple of time period see Binns in Fig. 3 (See transformed with slack stealing between 9-10, 10-11, and 11-12).



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Per claim 21, the limitation of "said first one of said processes is a critical process monitor, and said one or more of said plurality of processes includes a critical process", see Imanishi, time critical process in col. 1, lines 43-61.

Per claim 22-23, see the rejection of claim 19.

***Conclusion***

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Majid A. Banankhah** whose voice telephone number is (703) 308-6903. A voice mail service is also available at this number.

All response sent to U.S. Mail should be mailed to:  
**Commissioner of Patent and Trademarks**  
**Washington, D.C. 20231**

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-9600.

Majid Banankhah

3/15/04

MAJID BANANKHAH  
PRIMARY EXAMINER

